

## CLAIMS

1. In an electric motor having a shaft, a bearing located within a housing adapted to be filled with lubricant, and passages communicating the shaft and the bearing, the improvement comprising:

at least one centrifugal lubricant pump stage located in the housing, the pump stage having an impeller attached to and rotating with the shaft and a mating diffuser for pressurizing the lubricant; and

a flow passage leading from the lubricant pump stage to the bearing.

2. The apparatus of claim 1, wherein:

the at least one pump stage further comprises a second pump stage having an impeller and a diffuser mounted in the housing downstream of the first pump stage for further pressurizing the lubricant.

3. The apparatus of claim 1, wherein:

the diffuser is upstream of the impeller.

4. The apparatus of claim 1, wherein:

the pump stage is oriented for discharging lubricant in an opposite direction from the bearings.

1       5.       The apparatus of claim 1, wherein:

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3       the impeller of the pump stage has substantially radial flow passages.  
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6       6.       The apparatus of claim 1, wherein:

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8       a chamber is located in a lower portion of the housing for containing a volume of lubricant;  
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10       the shaft is hollow and has a passage within for communicating fluid from the chamber to  
11       the bearings; and

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13       the pump stage discharges downward.  
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16       7.       An electric submersible pump assembly for a well, the assembly comprising:

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18       an electrical motor having a shaft, a bearing located within a housing adapted to be filled  
19       with lubricant, and passages communicating the shaft and the bearing;  
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21       a chamber located in a lower portion of the housing for containing a volume of lubricant;  
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23       a flow passage within the shaft leading from the chamber to the bearing;  
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25       first and second centrifugal lubricant pump stages, each pump stage located in the housing  
26       and each having an impeller attached to and rotating with the shaft and a mating diffuser for  
27       pressurizing the lubricant; wherein  
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1 the diffuser in the first pump stage leads to the impeller in the first stage, the impeller of the  
2 first stage leads to the diffuser of the second stage, the diffuser of the second stage leads to  
3 the impeller of the second stage, and the impeller of the second stage leads to the chamber;  
4 and

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6 a pump exterior of the motor and connected to the shaft for pumping well fluid.

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9 8. The assembly of claim 7, wherein:

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11 the impellers of the pump stages have substantially radial flow passages.

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14 9. The assembly of claim 7, wherein:

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16 the pump stages discharge downward and are located in a lower portion of the housing.

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19 10. A method of stabilizing a bearing in a motor having a hollow shaft and passages  
20 communicating the shaft and the bearings, the motor having a housing containing a volume  
21 of lubricating fluid, the method comprising:

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23 mounting at least one lubricant pump stage to the shaft within the housing, the pump stage  
24 having an impeller and a diffuser;

25  
26 rotating the shaft and the impeller, pressurizing the lubricating fluid with the pump stage to  
27 a pressure sufficient to induce a film of lubricating fluid between the shaft and the bearings,  
28 the film preventing the shaft from contacting the bearings, thus stabilizing the bearings.

